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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/672,493 | 09/29/2000 | Pallab Dutta-Choudhury | PM 271374 | 2629 |

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EXAMINER

CARTER, AARON W

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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2625

DATE MAILED: 03/11/2004

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/672,493

Applicant(s)

DUTTA-CHOUDHURY ET AL.

Examiner

Aaron W Carter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7-9, 13-15 and 18-23 is/are rejected.
- 7) ☒ Claim(s) 4-6, 10-12, 16 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 September 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

1. This action is responsive to papers filed on December 17, 2003.

Response to Amendment

2. In response to applicant's amendment received on December 17, 2003, all requested changes to the specification and claims have been entered.

Response to Arguments

3. Applicant's arguments, see Amendment A, pages 11-23, filed December 17, 2003, with respect to the rejection(s) of claim(s) 1-23 under 35 USC 102 and 35 USC 103 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of US Patent 6,608,920 to Su et al. ("Su"), please refer to new rejections made below.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-3 and 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 6,608,920 to Su et al. ("Su") in view of US Patent 5,640,200 to Michael.

As to claims 1, 7 and 8, Su discloses a method of training an object visual inspection system the method comprising:

Specifying a single region of alignment interest within an object image (column 2, lines 4-18 and column 4, lines 28-29);

Associating the single region of alignment interest with a plurality of regions of inspection interest within the object image (column 2, lines 15-18 and 30-32); and

Associating each of the plurality of regions of inspection interest with at least one respective inspection tool (column 1, lines 33-44 and column 2, lines 30-32, wherein the alignment region is associated by vectors to a plurality of measurement sites on a semiconductor device which are each inspected with the critical dimension measurement tool).

Su further discloses training of the alignment region from die to die, but neglects to explicitly disclose that each of the regions of inspection interest are trained for their respective critical dimension measurements. However, Michael discloses a method of training multiple inspection regions for at least one inspection tool (column 1, lines 52-60 and column 14, lines 43-46 and Abstract, wherein comparison, in the form of intensity or shape, corresponds to the inspection tool and wherein it is trained to incorporate variations caused by the inspection environment). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the method of training an object visual inspection system as disclosed by Su with the training of multiple inspection regions for at least one inspection tool as

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disclosed by Michael. This would provide the advantage of not only relying on the CAD design rules of circuit patterns for CD measurements sites, but including a “golden template” by training the multiple sites that are on a physical die to incorporate variation caused by the inspection environment, such as video noise (column 14, lines 43-46).

As to claim 2, the combination of Su and Michael disclose the method of claim 1, Michael further discloses wherein training each of the at least one respective inspection tools requires performing statistical training using a plurality of training images (column 14, lines 43-46 and Abstract, wherein comparison, in the form of intensity or shape, corresponds to the inspection tool and wherein it is trained to incorporate variations caused by the inspection environment).

As to claims 3 and 9, the combination of Su and Michael disclose the method of claim 1, Michael further discloses wherein training for each of the plurality of regions of inspection interest, is performed in any order among regions of inspection interest (column 14, 43-46, wherein the regions are trained but no specific order is defined, however it is inherent that they are trained in some order, whatever it might be, and therefore satisfies the limitation of the claim, wherein training is performed in any order).

6. Claims 13-15 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Su and Michael as applied to claims 1-3 and 7-9 above, and further in view of US Patent 5,796,868 to Dutta-Choudhury ("Dutta-Choudhury").

As to claim 13, Su and Michael disclose the majority of the limitations as discussed above in rejections made for claim 1, they do not however explicitly disclose a camera, display, processor, memory, etc. However, Dutta-Choudhury discloses a visual inspection system comprising:

A machine vision system coupled to a camera, the machine vision system including (Fig. 1A):

A display that displays the acquired image-data (Fig. 1A);

A processor coupled to the display via a bus (Fig. 1A);

A memory buffer coupled to the display and the processor via the bus (Fig. 1A);

A visual data acquisition system interface coupled to the display, processor and memory buffer via the bus and to the camera (Fig. 1A);

A user interface coupled to the display, processor, memory buffer and visual data acquisition system via the bus (Fig. 1A);

A controller coupled to and controlling cooperation of the display, the processor, the memory buffer, the visual data acquisition system interface and the user interface via the bus (Fig. 1A);

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the machine vision system disclosed by the combination of Su and Michael

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with the system components as taught by Dutta-Choudhury. This providing the advantages of decreased human involvement in machine vision inspection (column 1, lines 11-28).

As to claim 14, the combination of Su, Michael and Dutta-Choudhury the system of claim 13, wherein Dutta-Choudhury further discloses, coupled to the machine vision system, a camera that acquires image-data including a digital representation of objects (Fig. 1A, element 16, column 7, lines 9-13).

As to claim 15, please refer to rejections made for claim 2 above.

As to claim 18, refer to the rejection made for claims 1 and 13 above.

As to claim 19, refer to the rejection made for claims 1 and 13 above.

As to claim 20, the combination of Su, Michael and Dutta-Choudhury the system of claim 19, wherein Michael further discloses wherein the trained image-data includes template image-data (column 9, lines 43-45).

As to claim 21, the combination of Su, Michael and Dutta-Choudhury the system of claim 19, wherein Michael further discloses wherein the trained image-data includes standard deviation image-data (column 10, lines 17-20).

As to claim 22, refer to the rejection made for claim 2 above.

As to claim 23, the combination of Su, Michael and Dutta-Choudhury the system of claim 13, wherein Michael further disclose that the at least one inspection tool is one of an intensity difference inspection tool, feature difference inspection tool or blank scene inspection tool (Michael, column 15, lines 5-9 and column 16, lines 15-18, wherein photometrics corresponds to intensity difference inspection tool).

Allowable Subject Matter

7. Claims 4-6, 10-12 and 16-17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

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however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.


US Patent 6,333,992 to Yamamura et al. discloses machine vision system that uses multiple tools for various inspection regions.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Aaron W Carter whose telephone number is (703) 306-4060. The examiner can normally be reached on 7am - 3:30 am (Mon. - Fri.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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